

hedron forms a kind of keel. No details as to the heights attainable are given. The most convenient place for the attachment of the flying end is said to be the extreme point of the bow. If the cord is attached to points successively further back on the keel, the flying end makes a greater and greater angle with the horizon, and the kite flies more nearly overhead; but it is not advisable to carry the point of attachment as far back as the middle of the keel. A good place for high flights is a point half way between the bow and the middle of the keel.

"Tetrahedral kites combine in a marked degree the qualities of strength, lightness, and steady flight; but further experiments are required before deciding that this form is the best for a kite or that winged cells without horizontal aeroplanes constitute the best arrangement of aéro-surfaces.

"The tetrahedral principle enables us to construct out of light materials solid frameworks of almost any desired form, and the resulting structures are admirably adapted for the support of aéro-surfaces of any desired kind, size, or shape."

The diagrams illustrating the article show various examples of the formation of complex kites from tetrahedral cells. One form suggested by Prof. Langley's aërodrome, but different in construction and appearance, is shown in Fig. 4, reproduced from an illustration in the article. That some of these complex kites are on a very large scale is evident from a case cited, in which an aërodrome kite, which was struck by a squall before it was let go, lifted two men off their feet, and subsequently broke its flying cord, a Manila rope of three-eighths inch diameter.

The simplicity of the construction of the cells, and the obvious possibilities of their combination, lend an additional fascination to a subject which is already full of interest.

#### BIBLE AND BABEL.

IN the number of the Johns Hopkins University *Circulars* for June (vol. xxii. No. 163), Prof. Paul Haupt has published an article entitled "Bible and Babel," referring to the somewhat heated controversy on Babel and the Bible which has raged recently in Germany, with which our readers are probably familiar. The line which he takes up is briefly that all the heterodox views which were expressed by Prof. F. Delitzsch in his famous lecture delivered in the august presence of the German Emperor had already been promulgated by himself, Prof. Haupt, at various periods during the last twenty-four years. Prof. Haupt claims to have made correct deductions in respect of the origins of the Biblical accounts of the Creation, the Deluge, &c., long before Prof. Delitzsch's lecture was delivered, but it must be clearly pointed out that, although such may be the case, he was not the first, even twenty-four years ago, to prove that the narratives usually accredited to Moses are merely modified recensions which we owe to the prophets of the captivity in Babylon. Whatever credit is due either to Paul Haupt or Prof. Delitzsch in this matter, it must never be forgotten that all important statements made by them with regard to the Creation and Deluge tablets are derived from the works, writings, and oral remarks which were made by the late General Sir Henry Rawlinson, G.C.B., and the late Mr. George Smith, of the British Museum. Both Profs. Delitzsch and Haupt are skilled elaborators, but in our opinion they are not discoverers, and certainly neither of them can be placed side by side with such publishers and translators of text as the two famous Englishmen we have already mentioned. Still less can either be regarded as the author of the heterodox views and statements which so thoroughly shocked His Majesty the German Emperor.

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#### NOTES.

IN connection with the tenth meeting of the Australasian Association for the Advancement of Science, to be held at Dunedin next January, particulars of which we gave in our issue for May 28 (p. 85), we learn from the *Otago Daily Times* that the colonial Government is rendering the Association material assistance. The New Zealand honorary secretary, Mr. G. M. Thomson, has received from Sir J. G. Ward, Colonial Secretary, a letter which states that the Government will assist the association in the following respects:—(1) A sum of 500*l.* will be placed on the Estimates of the present year towards the expenses of the January meeting; (2) the Government printer will be instructed to do all printing required by the association free of cost to the association; (3) railway passes will be issued to visiting members of the association; and (4) any assistance that it may be in the power of the permanent departments of the Government service to render to the association will be readily afforded on application being made.

AN entire skull (partially restored) of the remarkable Egyptian Eocene mammal *Arsinotherium zitteli* is now exhibited in the central hall of the Natural History Museum. This magnificent specimen was obtained by Dr. C. W. Andrews during his last trip to the Fayum district, and has been cleaned and restored in the museum. Behind the enormous nasal horns are placed a pair of quite small horns, recalling the rudimentary back-horns of the giraffe. The dentition, although including a full series of incisors and canines, recalls that of the Proboscidea. It is hoped that the skull of the Siberian rhinoceros (*Rhinoceros antiquitatis*) recently dug up in Salisbury Square, E.C., may ultimately find a home in the museum, since it is by far the finest example hitherto discovered in this country.

AT an extraordinary general meeting of the members of the Jenner Institute of Preventive Medicine, held on Friday last, the resolution recently passed on July 22 to alter the name of the institute to "The Lister Institute of Preventive Medicine" was unanimously confirmed.

THE fourteenth annual general meeting of the Institution of Mining Engineers will be held on Wednesday, September 2, in the University College, Nottingham.

THE Amsterdam Academy of Sciences has awarded its Buis-Ballot medal, given once in ten years, to Prof. Richard Assmann and Dr. Arthur Berson, of the Aëronautic Institute at Tegel, near Berlin.

REUTER states that a scientific expedition, to explore the northern parts of the Pacific Ocean, will leave Stockholm next April by railway for Port Arthur by way of Siberia. At Port Arthur the expedition will embark on a ship under the leadership of M. Kolthoff, who will be accompanied by five or six other Swedish naturalists.

SIR TREVOR LAWRENCE, president of the Royal Horticultural Society, has announced that Sir Thomas Hanbury, K.C.V.O., has purchased for presentation to the society the estate and garden of the late Mr. G. F. Wilson, F.R.S., at Wisley, near Woking. The total area of the estate is 60 acres.

AT the meeting of the Wilts County Council on August 4, a letter was read from Sir Edmund Antrobus, the owner of Stonehenge, to Lord Edmond Fitzmaurice, M.P. (chairman of the council), in which Sir E. Antrobus said he was willing to sell Stonehenge, and eight acres of land surrounding it, to the nation for the sum of 50,000*l.* The council decided to send the letter to the Chancellor of the Exchequer.

MISS DOROTHY BATE, whose investigation of the fossiliferous caves of Cyprus has recently created much interest among palaeontologists, has also paid attention to the birds of that British dependency, and has written a paper on the subject which will appear in the next number of the *Ibis*. She has succeeded in making some good additions to the late Lord Lilford's "List of the Birds of Cyprus," which was published in 1889.

MR. R. C. L. PERKINS, who was employed for some years by the Sandwich Island Exploration Committee of the British Association to make zoological collections in the Hawaiian Archipelago, has received an appointment as economic entomologist in those islands, with the services of two assistants at his disposal. All the exertions that can be made will be required, as it is said that the crops in several of the islands are being completely ruined by introduced insects of various kinds and by fungoid diseases. No better selection could have been made for such a post, as Mr. Perkins is an expert on Hawaiian insects, and is still engaged in work upon them for the British Association committee.

THE manatee which has lately been added to the Zoological Society's living collection is an animal of much interest, as it does not belong to the ordinary species of the American coasts, but is a representative of the smaller form (*Manatus inunguis*) which is confined to the fresh waters of the Amazon. Here it was first discovered by the Austrian explorer Natterer, in the Rio Madeira, in 1830, and designated *inunguis* from the complete absence of nails on the hand, which are always present in *M. americanus*. A single living specimen of the same form was previously received by the Zoological Society in 1896, and its anatomy was described by Mr. Beddard in the *Proceedings* of the Zoological Society for 1897. The present manatee, which is a young animal about three feet long, has been placed in one of the tanks in the reptile house, and is fed principally upon lettuce. An excellent coloured figure of the marine manatee, based upon life-sketches made by the late Joseph Wolf, will be found in the mammal volume of Salvin and Godman's "Biologia Centrali-Americana."

ON the night of August 8 a destructive hurricane, which lasted five hours, swept over Martinique. The storm passed over Fort de France at 1 o'clock in the morning, taking a north-westerly direction. The barometer went down to 28.70 inches.

REPORTS of the following earthquake shocks on the Continent have appeared in the daily papers during the past few days:—*August 9*. Lisbon, 10.8 p.m. Three distinct shocks. Duration, three seconds, two seconds, and eight seconds respectively. Interval of two seconds between each shock.—*August 11*. Malta, 5.33 a.m. Duration, one minute. Naples, 5.35 a.m. Duration, two seconds. Syracuse, 5.38 a.m. Rumbling sounds heard. Canea, 6.9 a.m. Duration, thirty-two seconds. Direction, north to south. Walls of houses cracked. The shocks were felt in almost the whole of Eastern Sicily.

A LARGE party of delegates to the twenty-fourth annual meeting of French geographical and colonial societies, held at Rouen last week, is paying a visit to London, and on Monday was received by the council of the Royal Geographical Society, and entertained at luncheon. Twenty-four French geographical societies, nine kindred societies, and three foreign geographical societies were represented at the Rouen congress, and the members visiting England number eighty-two. At the luncheon, in responding to

the toast of "The Geographical Societies of France," proposed by the chairman, Major Leonard Darwin, M. Zévort, rector of the University of Caen, and president of the congress, said his claim to speak in that assembly was that he was the rector of a university, French in its character, founded by an English king, that he represented a city which was visited every year by hundreds of English people, and he was, moreover, the nephew of Pasteur speaking to a son of Darwin. Wherever the French had worked and the English had followed there had been great progress in civilisation and in the peaceful development of the human race. That was the spirit in which the delegates came to this country, and it was in that spirit they were welcomed.

A REPORT by the director on the work in the engineering and physics departments of the National Physical Laboratory during the half year ended June 30 gives interesting particulars of the research work in progress. In the wind pressure research in the engineering laboratory, the case of flat surfaces exposed to a perpendicular current of air has been worked out, and a general relation established which is now being tested for the case of larger surfaces exposed to the natural wind. The case of parallel plates at varying distances apart has been treated, and experiments are also in progress on the pressure on inclined surfaces. Drawings have been prepared, and some preliminary tests made for the research into the constants of steam. In the physics department Dr. Harker has continued his comparison between the air thermometer, the platinum thermometer and the thermojunctions, and the work is now complete for temperatures between 0° C. and about 1050° C. The first part of the work for temperatures up to 500° C. was done with M. Chappuis, at Sèvres, and the results have been published. Dr. Harker has also constructed and subjected to stringent tests a set of platinum thermometers for the British Association. A small research on the specific heat of iron at high temperatures—700° C. to 1000° C.—is nearly complete, and promises to be of interest. Mr. F. E. Smith's research on the resistance of mercury and the construction of a standard mercury resistance is practically complete. The value of the specific resistance of mercury will probably prove to be very close to that determined by the director and Mr. Fitzpatrick in 1888. On the assumption that the absolute value of the wire standards in the laboratory is known, the length of the column of mercury, 1 sq. mm. in section, having a resistance of 10<sup>9</sup> C.G.S. units, is found to be almost exactly 106.29 cm. The difference between Mr. Smith's results and those of the Reichsanstalt will not be more than some few parts in 100,000. An investigation of some importance into the changes in insulating strength of various dielectrics due to continued heating, by Mr. A. Campbell and Mr. Rayner, undertaken for the Engineering Standards Committee, promises to lead to results of value. In the metallurgical division the solidifying points and cooling curves of a series of pure iron carbon alloys have been determined, using platinum platinum-iridium and platinum platinum-rhodium thermojunctions. The range of carbon is from 0.15 to 3.55 per cent.; the range of temperature from 1502° C. to 1111° C. on the thermojunction scale. In addition to the above research work, nearly 600 tests have been made during the half year.

WE have received from Mr. E. Bohm two incandescent electric lamps which are specially designed to give good illumination vertically downwards. In both lamps the lower half of the bulb is made of fluted glass, which, acting as a row of lenses, serves to concentrate the light downwards;

one lamp has, in addition, opal glass for the upper half of the bulb, the filament being of the ordinary shape. The filament of the other lamp is fixed horizontally, and is zig-zag in shape; the upper half of the bulb in this case is of clear glass. The result of these designs is to give a distribution of light having the maximum candle-power in the vertical direction; in one of the lamps which we tested the vertical candle-power was 17.5, and the mean horizontal candle-power 10, thus practically reversing the values obtained with ordinary lamps. For situations in which good illumination directly below the vertical is specially required, these patterns of lamps should prove useful.

A VERY ingenious electrical type-setting machine is briefly described by M. Tavernier in a recent issue of the *Comptes rendus* of the Paris Academy of Sciences. The apparatus is similar in principle to the familiar linotype machines, but the operations of typing the copy and casting the type are separated; the operator works at an electrical typewriter, which produces a perforated tape, and at the same time an ordinary typed copy of the manuscript, which enables corrections to be made in the tape before the type is set up. The perforated tape is passed automatically through the type-setting machine, which is also operated electrically. The advantage of thus dividing the two operations is that the casting machine can be worked at a uniform maximum speed, and is independent of the skill of the typist. A further modification of the machine allows it to be used telegraphically; the perforated tape produced by the typewriter is passed through a transmitter, which sends signals over the line and reproduces in a receiving apparatus a duplicate of the tape, which can be used in the type-setting machine. The details of the various pieces of apparatus are not given, but there can be no doubt that the invention is likely to prove of great utility.

We have received the forty-sixth volume of the "Year-book" of the Austrian Meteorological Service for 1901. The operations of the central office include the usual work of a normal observatory, the control of about 400 stations of various classes, and telegraphic weather forecasts. There are, in addition, a large number of stations dealing with thunderstorms and hail, but purely rainfall observations are now under the control of another department. An active part is taken in the international balloon ascents; we have frequently referred to some of the preliminary results obtained. Another feature of the Austrian service is the erection of a number of stations for "weather shooting" for the dissipation of thunder clouds and prevention of damage by hail, but the operations hitherto have not led to the hope of unqualified success. A separate appendix accompanies the "Year-book," which includes very valuable discussions on thunderstorm observations and on isotherms for Austria, both papers illustrated by charts. In the discussion of thunderstorms, some very interesting and instructive conclusions are drawn as to their connection with geographical features and the distribution of barometric pressure. It may be interesting to note here that out of 94 cases of damage to trees by lightning in 1901, 27 were pine or larch, 20 oak, 17 poplars, and 10 pear trees. The beech tree, which is generally supposed to be practically free from lightning strokes, was only struck once, but there were several other trees which similarly escaped damage.

At the recent congress of the Royal Institute of Public Health, Prof. Moore, of Liverpool, read a paper upon a "Chemical Theory of the Transmission of Certain Infective Diseases." He pointed out that in many of the specific

fevers no micro-organism has been isolated, and suggested that in these a chemical body of the nature of an enzyme may be the ætiological agent. To account for the reproduction of this chemical substance, which is necessary to explain the phenomenon of infection, Prof. Moore supposes that, by its action upon some of the cells, more of itself may be formed. He points out that there are analogies to this action in the case of certain "catalytic" reactions.

A SECOND report of the Special Chloroform Committee of the British Medical Association has just been issued. Mr. Vernon Harcourt, F.R.S., describes some experiments made to estimate the amount of chloroform which may be dissolved by the blood, and an apparatus for the limitation and regulation of chloroform vapour when administered as an anæsthetic. Dr. Dudley Buxton discusses the clinical use of certain inhalers (including Mr. Harcourt's form), and Mr. Walter Tyrrell reports upon the use of Mr. Harcourt's inhaler. Prof. Sherrington, F.R.S., and Mr. Sowton describe a number of experiments made to measure that dosage of chloroform under which the mammalian heart can, and cannot, work efficiently. They conclude that the heart muscle rapidly takes up chloroform offered to it in the blood-vessels of its vascular system.

CAPTAIN LAMB, I.M.S., has made a series of experiments upon the action of the venoms of the cobra and of Russell's viper (*Daboia Russellii*) upon the red-blood corpuscles and upon the blood plasma (*Scientific Memoirs of the Government of India*, New Series, No. 4). Both these venoms are shown to have a marked hæmolytic action, both *in vivo* and *in vitro*. Cobra venom never induces intra-vascular clotting; in fact, it rather diminishes blood coagulability, while *Daboia* venom causes extensive intra-vascular clotting. *In vitro* cobra venom prevents the clotting of citrated blood or plasma which ensues on the addition of a soluble calcium salt; *Daboia* venom, on the other hand, increases the tendency of citrated blood and plasma to coagulate. In conclusion, Captain Lamb considers that his experiments do not support Martin's hypotheses that all snake venoms contain at least two toxic proteids, one being a neurotropic, the other a hæmotropic, poison, and that the action on blood coagulability is due to a setting free of nucleo-proteids.

THE current issue of the *National Geographic Magazine* contains an article by Dr. H. W. Wiley, chief chemist of the Department of Agriculture, on "The United States; its Soils and their Products." Little is said about the special features exhibited by the soils of the country, the article being, in fact, a brief summary of the acreage, yield, and value of the main crops grown in the United States, useful to the student who has no opportunity of consulting the "Year-book" of the Department of Agriculture. The two facts that are most striking are the relatively low yield per acre and the enormous diversity of the agriculture; Dr. Wiley, indeed, asserts that "within the borders of the United States are grown every agricultural crop known to the world." The article is illustrated by several interesting photographs, calculated to impress the reader with the magnitude of the scale on which farming is practised in the United States.

A MOST interesting and remarkable instance of local adaptation to abnormal conditions on the part of a mollusc is recorded by Baron E. Nordenskjöld in No. 704 of the *Zool. Anzeiger*. It appears that in the "Chaco" districts of South America a species of fresh-water limpet (*Ancylus moricandi*) is found during the wet season in the pools which are then abundant in the country. During the dry season, however, these pools are completely desiccated, and



the whole country then becomes a practical desert, over which clouds of fine dust are swept by the wind. In order to exist during this season of drought, the *Ancylus* closes up almost the whole of the inferior aspect of its limpet-like shell by a growth of shelly matter continuous with the margin of the latter, leaving only a small circular mouth at one end. As is well known, many land molluscs, more especially *Helix pomatia*, are in the habit of sealing up the apertures of their shells during seasons of drought or heat, but in none of these is the substance with which the mouth is closed identical with that of the shell. In localities where there is no marked dry season, the *Chaco Ancylus* remains throughout the year in its normal condition.

In part i. of the general report and statistics relating to mines and quarries for 1902, issued by the Home Office, we note evidence of a general increase in production with regard to coal, fire-clay, ironstone, gypsum, rock-salt, &c. It is interesting to find that gold ore showed an increase from 16,374 tons in 1901 to 29,933 tons in 1902.

In a paper on the diffusion of granite into schists (*Geol. Mag.*, May), Mr. E. Greenly suggests that the granitoid matter that has been injected *lit par lit* was intruded while the surrounding rocks were at a high temperature, and this view would help to explain the occurrence of lenticles of granite in complete isolation from the parent mass.

A USEFUL map of Peru, on the scale of 1:3,000,000, or an inch to a little more than forty miles, has been issued by Mr. Eduardo Higginson, Consul of Peru, Southampton. It shows the various ports and havens, railways completed and in progress, telegraphs, roads, forests, petroleum deposits, &c. On the back of the map are printed numerous particulars relating to the country, such as climate, agriculture, artesian wells, mineral wealth, manufactures, and various statistics. Of the industries, that of indiarubber is especially described.

To the *Proceedings* of the Geologists' Association for June (vol. xviii. part ii.), Dr. Catherine A. Raisin contributes an article on the formation of Chert, with especial reference to the bands and nodules in Jurassic strata. In some cases the silica may have originated from hot springs aided by the action of algæ; in other cases silica may have been directly derived from the sea water, but more often through the agency of siliceous organisms. Molecular changes that subsequently took place in the rocks have led to the dispersal and concentration of the silica in patches or layers. Mr. Jukes-Browne gives an account of the zones of the Upper Chalk in Suffolk.

In a paper on "The Marl-Slate and Yellow Sands of Northumberland and Durham," Prof. G. A. Lebour (*Trans. Inst. Mining Eng.*) remarks that these Permian strata rest on the stained edges of eroded Carboniferous rocks. Discussing the origin of the yellow sands which occur at the base of the Permian group, he is disposed to agree with R. Howse that they were wind-blown, and that consequently the overlying Marl-slate may rest somewhat irregularly upon them. Some of the inequalities observable between the divisions are, however, due to the fact that springs carry away portions of the sands, and this subterranean erosion leads to subsidence of the overlying Marl-slate or Magnesian Limestone. The Marl-slate is made up of thin limestones and shales, with marine shells and remains of land-plants, as well as amphibia, and numerous fishes the nearest existing analogues of which inhabit rivers and lakes. The organic remains thus indicate estuarine or lagunal conditions.

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A GERMAN Bohemian Archæological Expedition to Asia Minor, conducted by Drs. J. Jüthner, K. Patsch and H. Swoboda, and Architect F. Knoll, left Konia (Iconium) on April 4 on a roundabout journey to Isaura, to link on with the work of the Vienna Academy. They visited various towns and villages between Konia and the Lake of Bey Schehir, and investigated the interesting Hittite temple at Fassiler previously discovered by the American explorer Sterrett. In Kyzylschakiöj they made their most valuable epigraphical discovery of two fragments of a limestone stele, which is important since it bears on the history of the second century B.C., and illustrates certain aspects of Greek public law. An illustration is given of the ruined gate of the acropolis of ancient Isaura which confirms the statement that very little now remains. More than three hundred inscriptions were found, and numerous photographs were taken of monuments and landscapes; the map accompanying the report in *Deutsche Arbeit* (vol. ii. Heft 10, p. 784) was drawn by Prof. Jüthner.

PROF. JAMES WALKER'S "Elementary Inorganic Chemistry," published by Messrs. Geo. Bell and Sons, and reviewed in our issue for June 19, 1902, has been translated into German by Margarete Egebrecht and Emil Bose. The translation has been published by Messrs. F. Vieweg and Son, of Brunswick.

A SECOND edition of the "Guide to the Search Department of the Patent Office Library, with Appendices," has been published at the Patent Office, Chancery Lane. The first appendix is a descriptive list of unofficial class-lists, and digests of English and foreign patent specifications, and the second contains a select dictionary of words and phrases associated with inventions introduced under letters patent.

WE have received copies of the *Compte rendu* of the proceedings of the 1901 meeting of the Société Helvétique des Sciences Naturelles, held at Zofingen, and that of the 1902 meeting held at Geneva. The two volumes of *Verhandlungen* and *Actes*, containing the papers presented and addresses delivered in connection with the same meetings, have also reached us.

SUBJECTS of scientific interest take a prominent place in the current issue of the *Century Magazine*. Mr. Frank W. Stokes, who accompanied the Swedish South Polar Expedition under the leadership of Dr. Otto Nordenskjöld, contributes an article entitled "An Artist in the Antarctic," which is accompanied by three beautifully coloured plates by the author, and these give a vivid impression of the region described. M. J. Deniker writes of Lhasa, under the title "New Light on Lhasa, the Forbidden City." Miss A. K. Fallows explains, in a well illustrated paper, the means adopted to secure for New York a supply of pure milk.

THE first part of vol. ii. of "The Fauna and Geography of the Maldivé and Laccadive Archipelagoes: being an Account of the Work carried on and of the Collections made by an Expedition during the Years 1899 and 1900," which is being edited by Mr. J. Stanley Gardiner, has been issued by the Cambridge University Press. The first part of vol. i. of this work was reviewed in our issue of April 3, 1902, and the remaining volumes will be dealt with after the publication of the concluding part. The present fasciculus contains reports by Prof. S. J. Hickson, F.R.S., and Miss E. M. Pratt on the Alcyonaria of the Maldives, by Sir Charles

Eliot on Nudibranchiata, by Mr. L. A. Borradaile on the sponge-crabs, and by Sir John Murray, F.R.S., and the editor on lagoon deposits.

THE *Proceedings* of the Washington Academy of Sciences for July 18 is made up of a full account of a meeting held in Columbia University, under the auspices of the Washington Academy, to commemorate the distinguished services to knowledge of the late Major John Wesley Powell, together with a list of the 251 papers and articles written by him during the years 1867 to 1903. Major Powell's work as director of the Bureau of American Ethnology is well known to anthropologists, and his services to science as an explorer, geologist and organiser are of the same high value. As an observer in many fields of natural science, and as one who exerted great influence on scientific progress, Major Powell's memory will long be held in honour.

MESSRS. CHARLES GRIFFIN AND CO., LTD., have now published a tenth edition of Mr. Bennett H. Brough's "Treatise of Mine-Surveying." The book was first published in 1888, and was reviewed at length in our issue of August 2 of that year. The prediction made on that occasion—"as soon as the book becomes known, no English-speaking mine-agent or mining student will consider his technical library complete without it"—has been fully justified, as the issue of a tenth and revised edition shows. Descriptions of appliances invented since the ninth edition appeared at the beginning of last year have now been inserted in the book, and among these additions will be found accounts of Sir Howard Grubb's new sight for mining dials, of Gothan's instrument for surveying bore-holes, and of the Dunbar-Scott mine tacheometer. Besides these improvements, references to important papers lately published and recent examinations questions have been added.

THE current number of the *Popular Scientific Monthly*, in addition to other articles of general scientific interest, reprints the Romanes lecture delivered last June by Sir Oliver Lodge, F.R.S., and publishes the third of a series of papers on Hertzian wave wireless telegraphy by Prof. J. A. Fleming, F.R.S. Other papers are on the bird rookeries on the island of Laysan, and bacteria in modern economic agriculture. From the columns headed the progress of science we learn there are now somewhat more than 100,000 students in the colleges, universities, and technical schools of the United States, and somewhat more than 50,000 in the professional schools of theology, law and medicine. In 1901, 16,513 students graduated from colleges and technical schools, and of these 5050 were women. The number of pupils in secondary schools was in 1901 upwards of 600,000, as compared with less than 500,000 in 1878.

THE additions to the Zoological Society's Gardens during the past week include a Vervet Monkey (*Cercopithecus lalandii*) from South Africa, presented by Mr. — Townshend; two Malayan Bears (*Ursus malayanus*) from Malacca, presented by the Right Hon. Earl of Crawford; two Norwegian Lemmings (*Myodes lemmus*) from Norway, presented by Major-General C. S. Sturt; two Dwarf Chameleons (*Chamaeleon pumilus*) from South Africa, presented by Mrs. Mainwaring; four Tuberculated Iguanas (*Iguana tuberculata*) from Venezuela, three Elephantine Tortoises (*Testudo elephantina*) from the Aldabra Islands, two Radiated Tortoises (*Testudo radiata*) from Madagascar, deposited; a Japanese Deer (*Cervus sika*), born in the Gardens.

## OUR ASTRONOMICAL COLUMN.

BORRELLY'S COMET (1903 c).—The following elements and ephemeris for Borrelly's comet have been computed by Dr. Aitken, of the Lick Observatory, from observations made on June 22 and 30, and July 10 (Lick Observatory *Bulletin*, No. 47):—

### Elements.

T = 1903 August 27<sup>h</sup> 60<sup>m</sup> 56<sup>s</sup> G.M.T.

$$\begin{aligned} \omega &= 127^\circ 19' 25''.5 \\ \Omega &= 293^\circ 32' 55''.0 \\ i &= 84^\circ 59' 45''.3 \end{aligned} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} 1903.0$$

$$\log q = 9.518126$$

### Ephemeris 12h. G.M.T.

1903	True $\alpha$	True $\delta$	$\log \Delta$	Brightness
	h. m. s.			
Aug. 13 <sup>h</sup> 5 <sup>m</sup> ...	10 54 23 ...	+39° 24' 1" ...	— ...	—
" 15 5 ...	10 48 12 ...	+37° 42' 9" ...	9.947 ...	6.7
" 17 5 ...	10 42 2 ...	+35° 58' 0" ...	— ...	—
" 19 5 ...	10 35 58 ...	+34° 7' 2" ...	9.996 ...	7.4
" 21 5 ...	10 29 54 ...	+32° 7' 0" ...	— ...	—
" 23 5 ...	10 24 3 ...	+29° 54' 8" ...	0.038 ...	8.2
" 25 5 ...	10 18 30 ...	+27° 27' 0" ...	— ...	—
" 27 5 ...	10 13 31 ...	+24° 47' 3" ...	0.074 ...	7.9
" 29 5 ...	10 9 20 ...	+21° 54' 6" ...	— ...	—
" 31 5 ...	10 5 59 ...	+18° 53' 8" ...	0.100 ...	6.2

PROJECTION ON MARS.—In the first *Bulletin* issued by the Lowell Observatory, Flagstaff, Arizona, Mr. Percival Lowell describes the observations of a projection which was discovered on the terminator of Mars by Mr. Slipher at 15h. 34m. (G.M.T.) on May 25. Messrs. Lowell and Slipher afterwards alternately observed the projection, which lasted for about thirty-one minutes; the position angle varied from 204°.0 to 199°.8, and the projection was variously estimated as being removed from the terminator by a perpendicular distance of 0.067–0.075 of the radius of the disc; its length was 1".58, and it disappeared at 16h. 8m.

The projection was "suspected" again at 15h. 58m. on May 27, and, if really seen, had moved 7° in latitude and 8° in longitude during the twenty-four hours' interval. The observations lead to the conclusion that the projection was probably a cloud of dust about 300 miles long, travelling at about 16 miles an hour in a north-easterly direction, and dissipating as it went.

THE SATELLITE OF NEPTUNE.—Using the Crossley reflector, Prof. Perrine has obtained a series of photographs of Neptune's satellite which cover one complete revolution, January 4–January 16, 1902.

The measurements of forty-five plates show that a correction of +0°.55, with a probable error of  $\pm 0°.09$  in position angle, and of  $-0''.006$ , with a probable error of  $\pm 0''.020$  in distance, must be applied to Hall's elements as published in No. 441 of the *Astronomical Journal*.

The observations are recorded in *Bulletin* No. 39 of the Lick Observatory, which also contains a series of determinations of the position of the planet itself, at certain times, as determined from the same photographs.

THE ESTIMATION OF STELLAR TEMPERATURES.—The question of the relative temperatures of the different types of stars is one of the most important in astrophysics, and has lately been the subject of much discussion in consequence of the discovery that spark lines appear in the arc spectrum under certain special conditions. In *Astr. Nach.* (No. 3882), after reviewing the recent contributions to the discussion, Prof. Kayser suggests a method of estimating the temperatures of stars which is based on an idea put forward in 1876 by Sir George Stokes in a note appended to a paper by Sir Norman Lockyer (*Roy. Soc. Proc.*, vol. xxiv. pp. 352–4). In the case of an incandescent solid body the proportion of the more refrangible radiations increases with the temperature, and Stokes suggested that a line spectrum might behave in the same manner, so that at different temperatures different lines would be most persistent. Prof. Kayser thinks that, while this may not hold for the whole spectrum, it may be true for the lines of a definite series, such as those of hydrogen, or one of the series of lines of helium. On this supposition he has recently undertaken a preliminary investigation for the